

U.S. DEPARTMENT OF EDUCATION
Green Ribbon Schools

U.S. Department of Education Green Ribbon Schools 2013

For Public Schools only: ☐ Charter ☒ Title I ☐ Magnet ☐ Choice

Name of Principal Mr. Edward Docalovich
(Specify: Ms., Miss, Mrs., Dr., Mr., etc.) (As it should appear in the official records)

Official School Name Broughal Middle School
(As it should appear in the official records)

School Mailing Address 114 W. Morton St
(If address is P.O. Box, also include street address.)
Bethlehem PA 18015
City State Zip

County Northampton State School Code Number* 3464

Telephone (610) 866-5041 Fax (610) 807-5909

Web site/URL http://www-br.beth.k12.pa.us/Broughal/Broughal-Community-Middle-School.pa.us E-mail edocalovich@beth.k12.pa.us

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate.

Edward Docalovich Date February 12, 2013
(Principal's Signature)

Name of Superintendent* Dr. Joseph Roy
(Specify: Ms., Miss, Mrs., Dr., Mr., Other)

District Name* Bethlehem Area School District Tel. (610) 861-0500

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate. This is one of the highest performing green schools in my jurisdiction.

[Signature] Date 2/12/13
(Superintendent's Signature)

*Private Schools: If the information requested is not applicable, write N/A in the space.



PART II – SUMMARY OF ACHIEVEMENTS

Instructions to School Principal

Provide a concise and coherent "snapshot" that describes how your school is representative of your jurisdiction's highest achieving green school efforts in approximately 800 words. Summarize your strengths and accomplishments. Focus on what makes your school worthy of the title U.S. Department of Education Green Ribbon School.

PART III – DOCUMENTATION OF STATE EVALUATION OF NOMINEE

Instructions to Nominating Authority

The Nominating Authority must document schools' high achievement in each of the three ED-GRS Pillars and nine Elements. For each school nominated, please attach documentation in each Pillar and Element. This may be the Authority's application based on the Framework and sample application or a committee's written evaluation of a school in each Pillar and Element.

Nominating Authority's Certifications

The signature by the Nominating Authority on this page certifies that each of the statements below concerning the school's eligibility and compliance with the following requirements is true and correct.

1. The school has some configuration that includes one or more of grades K-12. (Schools on the same campus with one principal, even a K-12 school, must apply as an entire school.)
2. The school is one of those overseen by the Nominating Authority which is highest achieving in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental and sustainability education.
3. The school meets all applicable federal civil rights and federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

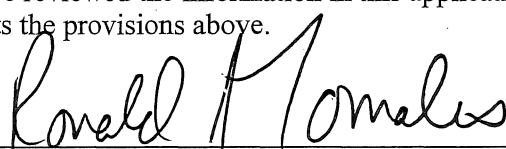
Name of Nominating

Agency Pennsylvania Department of Education

Name of Nominating

Authority Ronald J. Tomalis, Secretary of Education

I have reviewed the information in this application and certify to the best of my knowledge that the school meets the provisions above.


(Nominating Authority's Signature)

Date 2/14/13

**Pennsylvania Department of Education
Nomination for Green Ribbon Schools Award
Broughal Middle School, Bethlehem Area School District**

Broughal Middle School (BMS) is in the heart of the South Side of Bethlehem, and serves an ethnically diverse population of approximately 600 students in sixth through eighth grade. Ninety-three percent of the students receive free or reduced meals.

Broughal Middle School, which opened in the fall of 2009, is 186,000 square feet, and was designed as a STEM Signature School (science, technology, engineering and math) in the hope that STEM courses would provide students with opportunities to attend college and compete for jobs in the science and technology sector of the economy. It is the only school in the Bethlehem Area School District to be built for LEED Gold certification and is designed to improve energy savings, water efficiency, emissions and indoor environmental quality. And, because the new BMS was built on the site of the former school, no green space was lost for this new construction.

During the demolition of the old building, materials were sorted and recycled, and a minimum of twenty percent of the new construction materials contain recycled products. As required by LEED standards, a minimum of twenty percent of all building materials were manufactured within five-hundred miles of our site, which reduced transportation costs and carbon pollution.

BMS was designed to support a comfortable and energy efficient environment for students and staff. BMS has been able to reduce the usage of public water with the installation of a rainwater collection system. The 7,600 gallon cistern, housed in the center of the school, collects rainwater used to flush toilets and irrigate the grounds. To aid in water saving efforts, the school also uses waterless urinals, low-flow faucets and sensors on the sinks and toilets. Also, a parking deck housed below the school---and our green rooftop---assist in limiting water runoff.

By using a highly efficient HVAC system, BMS saves energy each year, and the entire building runs on set temperature points, which are triggered through a VAV box. Classroom lighting is controlled through motion sensors and the use of large windows and sky lighting to maximize natural light.

Non-porous flooring and wall coverings were used to eliminate dust and dirt accumulation. The majority of paints, sealants and adhesives used during construction were non-VOC (Volatile Organic Compound) to lessen the irritants for those with allergies and asthma.

The underground parking facility has dedicated parking for hybrid, electric vehicles and carpools, and includes a carbon monoxide monitoring system that controls the exhaust fans to maintain safe air quality levels in the garage.

The current day-to-day operations at Broughal follow the district-wide single-stream recycling program. This program allows the commingling of materials in all locations of the building so that recycling is available to all students and staff.

Broughal Middle School is proud of the fact that about 46% of the students walk or ride their bike to school. Air quality outside of the building is improved by clearly placed signs alerting buses and

cars of a no idling zone—and school property is also a no smoking zone. School buses running to and from BMS are the newest, low-emission buses in the fleet.

Student health and wellness is a critical component of why BMS has made changes to the built and natural environment. In partnership with area hospitals and non-profit organizations, BMS created a Community School to provide after school and summer programs for students, and to coordinate outreach efforts to families who may need basic necessities. The Family Center, located inside the school, has health examination rooms adjoining the nurse's office, and routinely provides free health and dental care in conjunction with St. Luke's Hospital.

As a STEM Signature School, the curriculum has been re-aligned and STEM courses replaced more traditional elective courses: science of foods in place of home economics, robotics in place of wood shop, as well as additional offerings in astronomy, television production, and environmental engineering.

Environmental education takes place both inside and outside of the school building. Students utilize the greenhouse and nearby community gardens to grow healthy foods. Seventh graders grow food that is used in the cafeteria, and in collaboration with the Southside Initiative, students raise seedlings that are used in community gardens throughout the south side of Bethlehem, and through this work they learn about community-based agriculture. A nearby urban greenway runs through the center of South Bethlehem and is utilized to promote exercise and physical activity.

Deserving special note is the partnership that BMS has undertaken with Lehigh University. Sixth graders are currently participating in a food composting project, using small classroom composters designed by Lehigh University students. The compost will then be used to enrich the soils in the greenhouse and community gardens. Eighth grade environmental engineering students work with Lehigh University students to monitor air quality in the school, and in surrounding neighborhoods. Using portable air monitors, students measured the levels of black carbon particulate and presented the results at a PTO meeting and in their classes. The Environmental Engineering class is in the process of implementing a project with the greenway

The Broughal Middle School will continue to promote quality learning opportunities in sustainable education and ready its students to be productive members of the community and environmentally aware citizens in the 21st century

School Contact Information

School Name: Broughal Middle School

School District (if applicable): Bethlehem Area School District

Street Address: 114 West Morton Street

City: Bethlehem

State: PA

Zipcode: 18015

School Website: <http://www-br.beth.k12.pa.us>

Principal First Name: Edward

Principal Last Name: Docalovich

Principal Email Address: edocalovich@beth.k12.pa.us

Principal Phone Number: 610-866-5041

Lead Applicant First Name (if different from principal): Laura and Karen

Lead Applicant Last Name (if different from principal): Keding and Wilmore

Lead Applicant Email: lkeding@beth.k12.pa.us; kwilmore@beth.k12.pa.us

Lead Applicant Phone Number: 610-866-5041

Level: Middle (6-8 or 9)

School Type: Public

How would you describe your school? Urban

Does your school have at least 40 percent of your students from a disadvantaged background? (students who are eligible for free and reduced-price school meals, students with disabilities, who are limited English proficient, migrant, or receiving services under Title I of the Elementary and Secondary Education Act)
Yes

Pillar 1: Environmental Impact and Energy Efficiency

Buildings, grounds and operations goal: The school has reduced its environmental impact and is working towards net-zero impact (zero carbon, solid waste, and hazardous waste footprints).

Pillar 1 includes four main elements:

- A) Reduced greenhouse gas emissions, using an energy audit or emissions inventory and reduction plan, cost-effective energy efficiency improvements and on-site renewable energy and/or purchase of green power.
- B) Improved water quality, efficiency, and conservation.
- C) Reduced solid waste production, through increased recycling, reduced consumption, and improved management, reduction, or elimination of hazardous waste stream.
- D) Expanded use of alternative transportation to, during and from school, through active promotion of locally-available options and implementation of enabling projects and policies.

Each question in this section is designed to measure your school's progress towards Pillar 1 and its associated four elements.

1A1: In what year was your school constructed? 2009

1A2: What is the total building area of your school? 186,000 square feet

1A3: Has your school constructed a new building or renovated an existing building in the past ten years?

Yes

Please provide the following information:

Percentage of the building area that meets green build standards (for example: LEED, CHPS, Green Globes or other standards) : 100%

Which certification did you receive and at what level? : LEED Gold

What is the total constructed area? : 186,000 square feet

What is the total renovated area? : 0%

1A4: Do any parts of your existing buildings meet green build standards (for example: LEED, CHPS, Green Globes, or other standards)? Yes

Please provide the following information:

What percentage of the existing building area has achieved green build standards (LEED, CHPS, Green Globes, or other standards)? : 100%

What is the total building area (in sq. ft.)? : 186,000 square feet

Which certificate did the school receive and at what level? : LEED Gold

1A5: Please indicate which green building practices your school is using to ensure your building is energy efficient.

School has fully implemented the Facility Energy Assessment Matrix within EPA's Guidelines for Energy Management.

Other (please describe): HVAC automation and control to limit equipment run times to only occupied periods, Lighting controls that utilize timers and sensor to minimize artificial light when not needed.

1A6: Has your school received EPA ENERGY STAR certification or does it meet the requirements for ENERGY STAR certification? Yes

If your school received the certification, please note the year it was achieved and the score received.

2012, score of 100

1A7: Has your school reduced its total non-transportation energy use from an initial baseline? Yes

Please provide the following information:

Percentage reduction : 21.1%

Measurement unit used (kBtu/square foot, kBtu/student, annual therms, etc.) : kBtu/SF

Time period measured (mm/yyyy-mm/yyyy) : 11/2009-9/2012

How did you document this reduction (i.e. ENERGY STAR portfolio, district report)? : ENERGY STAR Portfolio Manager

1A8: What percentage of your school's energy is obtained from:

On-site renewable energy generation (i.e. solar, wind, biomass) : 0

Purchased renewable energy : 0

1A9: Can your school demonstrate a reduction in its Greenhouse Gas emissions? Yes

Please provide the following information:

Initial GHS emissions rate (MT eCO₂/person) : 1.26

Final GHG emissions rate (MT eCO₂/person) : 1.02

Percentage reduction : 19.0

Time period measured (mm/yyyy-mm/yyyy) : 11/2009-9/2012

How did you document this reduction (e.g., the inventory module from Clean Air Cool Planet's Campus Carbon Calculator, EPA Portfolio Manager)? : EPA Portfolio Manager

1A10: Does your school reduce and/or offset the greenhouse gas emissions from building energy use? No
Please provide the following information:

1B1: What percentage of your students walk, bike, bus, or carpool (2+ students in the car) to/from school?
83%

1B2: How was this data collected and calculated? (Maximum 100 words)

Students were provided a transportation survey during their PM homeroom class. The results were compared to current data on bus students from the transportation department. We determined that 414 of 496 students surveyed walk, bike, bus or carpool to school. Approximately 260 students walk or bike, 69 students carpool and 85 students ride the bus.

1B3: Which of the following policies or programs has your school implemented:

Our school promotes bike/ped programs.

Our school has designated carpool parking stalls.

Our school has a well-publicized no idling policy that applies to all vehicles (including school buses).

Vehicle loading/unloading areas are at least 25 feet from building air intakes, doors, and windows.

1B4: Describe how your school transportation use is efficient and environmentally benign (e.g. the percentage of school-owned electric/hybrid/alternative fuel vehicles in your fleet, or other indicators of significant reductions in emissions):

Broughal Middle School capitalized on making transportation as efficient and environmentally responsible as possible in the selection of the location we chose to build our school. All alternatives to the present site would have required a significant increase in bus transportation and that was one of the arguments that resulted in the new school being constructed on the current Morton Street property.

1C1: Can you demonstrate a reduction in your school's total water consumption (measured in gallons/occupant) from an initial baseline? Yes

Please provide the following information:

Percentage reduction domestic : 63.4%

Percentage reduction irrigation : included in domestic

Time period measured (mm/yyyy-mm/yyyy) : 4/2010-9/2012

How did you document this reduction (i.e. ENERGY STAR Portfolio Manager, school district reports)? :
ENERGY STAR Portfolio Manager

1C2: Which of the following practices does your school employ to increase water efficiency and ensure water quality? (Please check all that apply)

Our school's landscaping is water-efficient and/or regionally appropriate.

Our school uses nonpotable water sources (i.e. rainwater) for irrigation or toilet flushing.

Our school has implemented stormwater best management practices and/or low-impact development strategies (i.e. rain gardens, vegetated swales, pervious paving, rainwater harvesting, green roofs).

Our school uses water control features in bathrooms, locker rooms, kitchens, etc. that include, low flow faucets, automatic sensor faucets, low flow toilets and shower heads.

Our school conducts annual audits of the facility and irrigation systems to ensure they are free of significant water leaks and to identify opportunities for savings.

Please provide the following information about your school's landscaping

What percentage of your total landscaping is considered water-efficient or regionally appropriate? : 100%

What types of plants are used and where are they located? : Planters are located in the front and west sides of the building that house dwarf burning bushes, blue rug junipers, drooping leucothoes and mountain peiris plants. Both evergreen and deciduous trees surround the urban school property including columnar hornbeams, american arbovitae, fastigate ginko, slender hinoki false cypress and redspire callery pear. A variety of Sedum species were planted on the "green roof".

Please describe the alternate water sources used for irrigation or toilet flushing. (Maximum 100 words)

On the roof are vegetative roof trays and roof drains used to collect water in the 7,600 gallon cistern. Water in the cistern is used to flush toilets throughout the building. Waterless urinals are installed throughout the building to decrease water demand. Overflow from the cistern fills an underground tank used to irrigate the athletic field. Total rainwater collection capacity is 15,000 gallons. The 3 story cistern serves as a focal point to students and visitors and spurs many conversations about water collection and use.

Please describe the program you have in place to control lead in drinking water. (Maximum 100 words)

Please describe your best management practices for stormwater. (Maximum 200 words)

On our roof are vegetative roof trays that absorb, filter and reduce the amount of water flowing into our sewer system. A stormwater management plan was developed and instituted to treat and capture 90% of the average annual rainfall in an underground detention basin. The stormwater plan limits the disruption of the natural hydrology. Stormwater control devices were installed in compliance with the management plan and the efforts earned 2 LEED points for stormwater design in quality and quantity control. The construction of a parking garage under the building also aids in stormwater management as it reduced the amount of paved surface for runoff.

1C3: Our school's drinking water comes from: Municipal water source

Please describe how the water source is protected from potential contaminants. (Maximum 100 words)

1C4: Please describe any additional progress your school has made towards improving water quality, efficiency, and conservation. (Maximum 200 words)

Low flow fixtures with occupant sensors and waterless urinals were installed during construction to reduce the burden of municipal water and wastewater. The building earned 4 LEED points for water efficient landscaping, innovative wastewater technologies and water use reduction over 30%. From our water conservation baseline in April 2010, the building has reduced total indoor and outdoor water use over 63%.

1C5: What percentage of the school grounds are devoted to ecologically or socially beneficial uses (school vegetable garden, wildlife or native plant habitats, outdoor classroom, environmental restoration projects, rain garden, pervious walking or running trails, etc.)? 10% or less

1C6: Do any parts of your outdoor landscape meet the National Sustainable Sites Initiative guidelines? If Yes, please explain. No

1D1: What percentage of solid waste is diverted from landfilling or incinerating due to reuse, recycling and/or composting (i.e. Recycling Rate)?

A - Monthly garbage service in cubic yards (garbage dumpster size(s) x number of collections per month x percentage full when emptied or collected). : 48 CY

B - Monthly recycling volume in cubic yards (recycling dumpster sizes(s) x number of collections per month x percentage full when emptied or collected). : 64 CY

C - Monthly compostable materials volume(s) in cubic yards (food scrap/food soiled paper dumpster sizes(s) x number of collections per month x percentage full when emptied or collected). : 0

Recycling Rate = $(B+C) / (A+B+C) \times 100$: 57%

1D2: Does your school have a composting system? Yes

1D3: Please provide the following information about your school's hazardous waste:

How much hazardous waste does your school produce (lbs/person[staff+students]/year)? : None

1D4: Which of the following benchmarks has your school implemented to minimize and safely manage hazardous waste? (Please check all that apply)

Our school has a hazardous waste policy for storage, management, and disposal that is actively enforced.

Our school disposes of unwanted computer and electronic products through an approved recycling facility or program.

All our computer purchases are Electronic Product Environmental Assessment Tool (EPEAT) certified products.

List the green cleaning standard(s) used.

1D5: Does your school use "third party certified" green cleaning products? No

1D6: What other indicators do you have of your school's reduction of solid waste and elimination of hazardous waste? (Maximum 200 words)

Broughal strives to reduce our output of solid waste and eliminate hazardous waste. We have a district-wide recycling program in place, which has significantly reduced our solid waste disposal. We also have reduced our solid waste with the use of hand dryers instead of paper towels. In the cafeteria, the breakfast and lunch trays are washable and also serve as plates. This reduces the use of paper products, which in turn reduces our solid waste. In 2010, we were able to switch the sizes of our trash and recycling dumpsters by switching two 8CY trash containers into two 6CY trash containers and increasing the 6CY recycling container to an 8CY recycling container. When the new school was built, all mercury and mercury containing science equipment were properly recycled and old computers are repurposed for use in elementary schools to avoid direct disposal of hazardous waste associated with computers and monitors.

1D7: This is the end of Pillar 1. Please describe any other accomplishments or progress your school has made towards reducing/eliminating environmental impacts or improving your energy efficiency. (Maximum 200 words)

Demolition of the original school required all materials to be recycled. 20% or more of materials used in construction of our new building came from within 500 miles, reducing air pollution from transportation. Broughal is an extremely efficient building achieving a baseline ENERGY STAR rating of 97. We continue to squeeze even more savings from our building by aggressively operating the building control systems and educating building occupants. Even starting from such a highly efficient level, Broughal reduced its total energy use over 20% from baseline levels achieving an Energy Star Rating of 100 for 2012. Demand controlled ventilation is utilized in the auditorium and hallway lighting schedules have been tightened, turning on lights only when the building is occupied. The efficient reclaimed water plumbing system supporting low flow fixtures and waterless urinals led to even more water savings than anticipated. The building HVAC system is operated to support spaces only when occupied. Energy efficient set points were established in a 2011 Energy Policy that established aggressive occupied set points of 67 for heating and 75 for cooling. Solar shades installed along a glass curtain wall reflect sunlight and reduce the heat load on the cooling system.

Pillar 2: Healthy School Environments

Healthy student and staff environment goal: The school improves the health and performance of students and staff.

Pillar 2 includes two main Elements:

- A) An integrated school environmental health program based on an operations and facility-wide environmental management system that considers student and staff health and safety in all practices related to design, construction, renovation, operations, and maintenance of schools and grounds.**
- B) High standards of nutrition, fitness, and quantity of quality outdoor time for both students and staff.**

Each question in this section is designed to measure your school's progress toward Pillar 2.

2A1: Which of the following practices does your school employ with regards to pest management? (Please check all that apply)

Our school has an integrated pest management plan in place to reduce and/or eliminate pesticides.

Pest control policies, methods of application, and posting requirements are provided to parents and school employees.

Copies of pesticide labels, copies of notices, MSDS and annual summaries of pesticide applications are all available and in an accessible location.

Our school prohibits children from entering a treated area for at least 8 hours after the treatment or longer if required by the pesticide label.

2A2: Which of the following practices does your school employ to improve contaminant control and ventilation? (Please check all that apply)

Our school has a comprehensive indoor air quality management program that is consistent with EPA's Indoor Air Quality (IAG) Tools for Schools.

Our school meets ASHRAE Standard 62.1-2010 (Ventilation for acceptable indoor air quality).

Our school has installed one or more energy recovery ventilation systems to bring in fresh air while recovering the heating or cooling from the conditioned air.

Our school has eliminated mercury-containing thermometers, chemical compounds, art chemicals, etc. and elemental mercury.

Our school disposes of any unwanted mercury laboratory chemicals, thermometers and other devices in accordance with federal, state, and local environmental regulations.

Our school has CO alarms that meet the requirements of the National Fire Protection Association code 720.

There are no wood structures on school grounds that contain chromate copper arsenate.

Our school visually inspects all structures on a monthly basis to ensure they are free of mold, moisture, and water leakage.

Our school has moisture resistant materials/protective systems installed (i.e. flooring, tub/shower, backing, and piping).

Our school has a chemical management program that includes: chemical purchasing policy (low or no-VOC products), storage and labeling, training and handling, hazard communication, spills (clean up and disposal), and selecting EPA's Design for the Environment approved cleaning products.

Our school prohibits smoking on campus and in public school buses.

If your school has combustion appliances, is there an inventory of them and are they annually inspected to ensure they are not releasing Carbon Monoxide? (yes/no/no combustion appliances): yes

Our school has an asthma management program that is consistent with the National Asthma Education and Prevention Program's (NAEPP) Asthma Friendly Schools guidelines.

2B1: Which practices does your school employ to promote nutrition, physical activity and overall school health? (Please check all that apply)

Our school partners with local food growers to supply produce.

Our students spent an average of 120 minutes per week over the past year in school supervised physical education.

Our school has an onsite food garden.

Our school participates in the USDA's Healthier School Challenge or another nutrition recognition program.

Please list your school's USDA Healthier School Challenge award level or describe other nutrition program. (Maximum 100 words)

Broughal is part of the National School Lunch/Breakfast Program.(NSLP) The federally mandated and funded program set standards for portion control as well as limiting the amounts of sugars,fats, and sodium intake. Eight-eight percent of our students qualify and participate in this program.

Please describe the type of outdoor exercise opportunities and nature-based recreation available to students. (Maximum 200 words)

When the weather permits it, students are outside for physical education. Students have PE 2-3 times a week for half of the school year. Health and nutrition topics are covered in health class and through speakers. Students attend health class 1 time a week for half of the school year. There are a number of after school sports programs for students including physical activity related clubs such as zumba, bike works, gardening club, and weight training. Each year, all students participate in a field day which is a full day of indoor and outdoor physical activities. This coming school year an environmental component will be added to field day.

2B2: Our school encourages teaching and learning outdoors on school property or has opportunities in neighboring public open spaces; such as parks, trails, or community gardens. If yes, please explain.

Yes: Students in the environmental engineering course utilize school grounds as well as the neighboring college campus to practice tree and flower identification. The garden club students utilize a number of local gardens to grow produce.

2B3: What percentage (by cost) of food purchased by your school is certified as "environmentally preferable" (e.g. Organic, FairTrade, Food Alliance, Rainforest Alliance, etc.)? None

2B4: This is the end of Pillar 2. Please describe any additional progress your school has made in terms of the school's built and natural environment (including unique community and/or business partnerships) to promote overall student and staff health and safety. (Maximum 200 words)

Dining services is in the process of applying to the USDA Healthier School Challenge. Broughal created a Community School in partnership with Lehigh University, Just Born, St. Luke's Hospital and the United Way. The partners work together to provide after school and summer programs for students, and to coordinate outreach efforts to families who may need basic necessities. The Family Center, located inside the school, has health examination rooms adjoining the nurse's office, and routinely provides free health and dental care in conjunction with St. Luke's Hospital. Efforts continue to use our greenhouse and nearby community gardens to grow healthy foods and to use the new Greenway that cuts through the center of urban South Bethlehem to promote exercise and physical activity. Additionally, the underground parking facility that has dedicated parking for hybrid, electric vehicles and carpools, maintains a carbon monoxide monitoring system that controls the exhaust fans to maintain safe air quality levels in the garage. Lehigh University students participated in an air quality impact study which monitored outdoor air quality along student walking routes around the school. Broughal earned 8 LEED points in indoor environmental quality for use of low emitting materials, IAQ management plans and controllability of systems.

Pillar 3: Environmental and Sustainability Education

Student achievement goal: Provide effective environmental and sustainability education, incorporating STEM, civic skills and green career pathways.

Pillar 3 includes three main Elements:

- A) Interdisciplinary learning about the key relationships between dynamic environmental, energy and human systems.
- B) Use of the environment and sustainability to develop STEM content knowledge and thinking skills to prepare graduates for the 21st century technology-driven economy.
- C) Development of civic engagement knowledge and skills, and students' application of these to address sustainability and environmental issues in their community.

Each question in this section is designed to measure your school's progress toward Pillar 3.

3A1: Is your school district's curriculum aligned to the Pennsylvania Environmental and Ecology standards?

Yes

3A2: Which practices does your school employ to help ensure the environmental and sustainability literacy of your graduates? (Please check all that apply)

Environmental and sustainability concepts are integrated throughout the curriculum.

Environmental and sustainability concepts are integrated into classroom based and schoolwide assessments.

Please describe your school's environmental or sustainability literacy graduation requirement. (Maximum 200 words)

Please describe your classroom based on schoolwide assessments in environmental and sustainability concepts and include what percentage of students scored "proficient" or better. (Maximum 200 words)

The school-wide assessment in environmental and sustainability concepts is the science PSSA, which is a yearly state standardized test given to all eighth grade students. The percentage of students, who scored proficient or better are as follows: 2010-22.4% and in 2011 the percentage is estimated to be 24%. Broughal is working extensively with Lehigh University's Dr. Alec Bodzin to develop our science curriculum in areas such as GIS, plate tectonics, energy, climate change and land use to ensure continued growth in these areas.

Please describe professional development opportunities available in environment and ecology standards. Include the percentage of teachers who participated in these opportunities over the past 2 years. (Maximum 200 words)

3A3: If your school serves grades 9-12, please provide the following information:

3B1: Do your school's science courses frequently use sustainability and the environment as a context for learning science (such as asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, constructing explanations, and engaging in argument from evidence when exploring environmental and sustainability issues)? Yes

Please describe. (Maximum 200 words)

Every science course has required labs as a district-wide component of the curriculum. The goal of the district is to increase rigor and relevance of labs and tests and students are being asked to find real world applications for their studies. Elective courses are based around science, technology, engineering and math (STEM) curricula. Our students are partnered with Lehigh engineering student to design and create cars and test them. Mathematical models, CAD software, and problem-solving are an integral part of this project. Our rooftop greenhouse, planetarium, science labs and physical plant features of this building allow children to experience data collection and analysis as well as living the concepts of sustainability.

3B2: Since green/sustainable concepts cross curriculum areas, where within the following standards content are they being taught, at what grade levels and what main resources are being used?

	What Standard Areas	Main Content Addressed	Grade Levels	Main Resources
1	4.1 Envir & Ecology	Gardening Club, Science Fair Community School Clubs	6-8	greenhouse
2	3.2	physical science	6	text, internet, planetarium
3	4.4 envir & Ecology	Life Science	7	test lab materials
4	3.1Sci & Tech	Earth and Energy science	8	text, lab materials online GIS
5	4.1,4.5 Envir & Ecology	Environmental sciences, food webs, biomes, mapping. LEED characteristics and populations	8	text, primary sources
6	4.2,4.4,4.5 Envir & Ecology	Environmental engineering	8	text, primary sources
7	4.5,4.1,4.2	Global Issues	8	primary sources, text
8	4.4 Envir & Ecology	Science of Food	7	primary sources

3B3: Does your school have a STEM curriculum and/or coordinator? Yes

Please explain. (Maximum 200 words)

The new Broughal was constructed as a STEM Signature school, in the hope that STEM courses would give our economically disadvantaged students opportunities to go to college and compete for jobs in the science and technology sector of the economy. In addition to LEED Gold certification and environmental education features making this an environmental learning facility, the school has a greenhouse, planetarium, technology labs and robotics courses, a tv studio, and fully equipped science labs for each grade level. STEM courses replaced more traditional elective courses: science of foods in place of home economics, robotics in place of wood shop, as well as additional offerings in astronomy, television production, and environmental engineering. The infusion of support from community partners in the form of tutors and experiences like visits from our local PBS station and trips to a television studio in Philadelphia, engineering contests planned in conjunction with Lehigh University students, and collaboration in using the new Rails to Trails Greenway near our school capitalize on the special features of our building and take them to the next level.

3B4: Has the school's use of green building materials, alternative or renewable energy sources or green technologies, been incorporated into the curriculum and/or utilized by teachers and students in the classroom? Yes

Please explain. (Maximum 200 words)

Broughal's use of green building materials have been incorporated into the Environmental Engineering course. Students learn about all of the green features of the building and develop a presentation for there peers. Eighth grade science students study alternative and renewable energy in our energy unit which we piloted for Lehigh University with a grant from the Toyota USA Foundation. In TV production, students research and present segments that are shown on our morning program.

3B5: If your school is a high school, does your school curriculum make connections between classroom and college and career readiness, in particular post-secondary options in environmental and sustainability fields? N/A

Please describe these college and career connections. (Maximum 200 words)

3C1: Do students conduct an age-appropriate, self-selected, civic/community engagement project at every grade level? Yes

If not in all grades, please specify which grades.

3C2: Do students have meaningful outdoor learning experiences (experiences that engage students in critical thinking, problem solving and decision making) at every grade level? Yes

Please share how outdoor learning is used to teach an array of subjects in contexts, engage the broader community, and develop civic skills. (Maimum 200 words)

Currently students in all grades are eligible to participate in the garden club. The students raise vegetable and herb seedlings, which are provided to the Southside Community gardens. All students are eligible to join the Green Club, which work with a variety of environmental problems. In sixth grade we have implemented a composting component in conjunction with Lehigh University. Lehigh designed and built small composters for classroom use, which the class will explore the science behind composting as well as the environmental benefits. The 7th grade Science of Foods students use our greenhouse to raise food crops which are later used in the class. The 8th grade Environmental Engineering class work with Lehigh University students monitoring the air quality using portable air monitors. They monitored the levels of black carbon particulate matter. The students walked home from school while monitoring, at the same time another group monitored an alternative route. The students presented the results at a PTO meeting as well as classroom presentations. The Environmental Engineering class is in the process of implementing a project with the greenway. Our field day will have an outdoor learning experience for the students this year.

3C3: What opportunities exist for parents to learn about the green practices implemented at your school, including how these practices are benefiting the children and reducing operation and maintenance costs?

Broughal parents and the community have many opportunities to learn about the implementation of green practices at our school. At our Back to School night a presentation was given on these practices. Students have given presentations at the PTO meetings and to focus groups. Information can be found on the website as well as articles in our school paper, Broughal Blast.

3C4: Please describe your partnerships with the local community (e.g., academic, business, government, nonprofit and informal science institutions) to help advance your school, other schools (especially schools with fewer resources) and the greater community toward the 3 Pillars. Include both the scope and impact of these partnerships. (Maximum 300 words)

Through our Community School programs, Broughal students are able to attend classes at the Banana Factory. In one sculpture class, eight students teamed with a local artist to create a sculpture for the Greenway called Blue Herons using found objects. The sculpture symbolizes environmentally healthy communities. The garden club raises seedlings that are used in the community gardens, which the club helps tend. Northampton Community College and Cops 'n Kids Literacy Program have collaborated with Broughal staff on an after school writing program. Successful meetings with local reporters have blossomed into an author visit from Gary Schmidt, who wrote *Okay for Now*, a book that all students and staff read together at the beginning of the year, and the launch of a second school-wide read. Out of this partnership grew a scholarship program to allow our students to attend Horizons for Youth summer courses at the community college. In addition to its role as a Community School partner, Lehigh University also runs an Integrated Professional Development School at Broughal. Lehigh faculty and students assist Broughal staff in the integration of new teaching practices and technology. Lehigh students provide tutoring on demand during the school day and in afterschool sessions for any child who chooses to attend. Our St. Luke's Hospital partner provides free health and dental care to Southside families onsite. Local businesses and banks provide financial support for programming and school needs. Healthy Highmark Foundation has given us \$20,000 over the past two years for fitness programs and equipment, and KNBT Bank has donated \$5000 towards the seating we need to complete our planetarium. Success begets success and we are doing all we can to develop our community partnerships and strengthen the pillars that support our students and their families.

3C5: This is the end of Pillar 3. Please describe other methods and measurements your school uses to ensure matriculating students are environmentally and sustainability literate. (Maximum 200 words)

In early adolescence, our most important educational goal is to pique the interest of our students by exposing them to the basic tenets of environmental education and provide a base of knowledge and interest that can become a more sustainable literacy as they attend high school and college. To encourage our students to take advantage of community resources, we are negotiating with Northampton Community College to provide scholarships so our students may attend summer youth courses at the emerging Southside Campus. There is a difference between providing resources and utilizing them and our efforts are invested in deepening these partnerships and impacting more families.